DESIRED CONDITIONS OVERVIEW

Desired Conditions

The mission of the Forest Service is 'caring for the land and serving the people.' The overall USDA Forest Service Strategic Plan (FY 2008-2012) further defines the mission 'to sustain the health, diversity, and productivity of the Nation's forest and grasslands to meet the needs of present and future generations.'

Desired conditions describe the vision for achieving the Forest Service's mission on the George Washington National Forest. They portray the aspirational ecological, social and economic conditions that have been identified through an integration of input from the public comments we have received, national and regional Forest Service goals, changes and trends affecting the George Washington National Forest, and the best available science for various resources and uses of the forest.

Some desired conditions apply across the entire forest's landscape and some are more specific to geographic areas such as an area designated as a wilderness, or a socially-special area that reflect community values or local conditions within the area. These areas, referred to as management prescription areas, on the forest include a variety of distinctive settings with exceptional or uncommon, biological, geological, scenic, research, wilderness, recreational, or cultural values. For some management prescription areas, specific guidance for managing the various categories of special areas are identified in Forest Service policies and directives, national requirements, or individual management plans.

Just like ecosystems, many desired conditions are interrelated across resource areas and are not mutually exclusive. The recurring theme that runs throughout these descriptions is the focus on sustaining the diverse terrestrial, aquatic and vegetative communities unique to the southern Appalachians through the foundation of healthy watersheds, productive soils, and healthy airsheds. This in turn will allow the George Washington National Forest to continue to provide a large holding of public land that can offer many different social and economic contributions of the forest for current and future generations.

In some cases, our desired condition matches the current condition so our goal is to maintain what we have. But in other cases, we need to work toward meeting the desired conditions and success in achieving them can only be measured over the long-term.

The Forest may need to make adjustments in the desired conditions if monitoring results indicate they are not achievable in the long-term or if there is an imbalance in what the Forest is accomplishing. Budget levels are an important factor in moving toward the desired conditions. Desired conditions are aspirations; they are not final decisions or commitments to action. Desired conditions give a sense of the type and extent of human influence that a forest visitor could expect.

FOREST-WIDE DESIRED CONDITIONS

Watersheds - Water, Soil, Air, and Geology

Watershed Resources

Background

The lands known today as the George Washington National Forest could hardly have been called a "forest" in 1917. Repeated wildfires, clearing of steep mountain land for farming and grazing, iron ore mining, and widespread, indiscriminate logging led to severe erosion and increased flooding. As a result, by the early

1900's, much of the higher elevation mountains and ridges in southwestern Virginia had been transformed into charred stumps and brushfields (The Lands Nobody Wanted, Conservation Foundation Report, 1977). In 1911, Congress authorized and directed the Secretary of Agriculture "*to examine, locate, and purchase such forested, cut-over, or denuded lands within the watersheds of navigable streams as in his judgment may be necessary to the regulation of the flow of navigable streams or for the production of timber,"* through the Weeks Law. In 1917, as a result of this Act, the George Washington National Forest (known at that time as the Shenandoah National Forest) was established from these "lands nobody wanted."

We intend to continue the tradition of watershed restoration, protection and stewardship begun on this national forest over 90 years ago. Maintenance and restoration of healthy, diverse, and resilient watersheds will be given the highest priority in all of our management activities. Watershed, riparian, and aquatic species protection goals, objectives, desired conditions, and standards do not vary across the Forest. We do not have more or less stringent standards in one area versus another.

The George Washington National Forest is located in two major river drainages, the James and Potomac, both of which drain into the Chesapeake Bay.

Relatively undisturbed watersheds, or reference watersheds, help define systems with a high level of integrity. Five watersheds have been identified as reference watersheds on the Forest. The streams within these watersheds have existing water quality conditions considered to be representative of the ecological sub-section under relatively undisturbed, natural situations.

Table xx. Reference Watersheds

Reference Watershed	Location	Acres
Lost Run	Laurel Fork Special Biological Area	592
Morgan Run	Southern Massanutten	817
Ramsey's Draft	Ramsey's Draft Wilderness	6,298
North Fork Simpson Creek	Rich Hole Wilderness	1,900
Little Cove Creek	Mt. Pleasant National Scenic Area and Appalachian Trail Corridor	867

Desired Conditions for Watersheds

Watersheds within the Forest are resilient, have intact hydrologic function, and support the quality and quantity of water necessary for channel maintenance, aquatic habitats, riparian habitats and beneficial water uses, including public water supplies. Watersheds are not contributing sediment to streams at levels which adversely impact downstream uses, riparian ecosystems and aquatic lifecycles. There are no actively eroding areas where sediment is affecting a stream's beneficial uses.

The reference watersheds remain in a relatively undisturbed condition, with a low level of human intervention or impact. These areas retain a natural, forested appearance shaped primarily by natural processes. Uneven-aged forest communities with intermediate to high shade tolerance dominate the area. Landscapes feature a structurally diverse older aged

forest community with a continuous forested canopy, with the exception of occasional gaps created by storms, insects, diseases, or fire. Insects and diseases play a role in shaping future species composition and successional stages across these areas. Streams within reference watersheds have water quality conditions considered to be representative of the ecological sub-section under relatively undisturbed, natural situations.

Channeled ephemeral streams maintain their hydrologic function and the areas adjacent to these streams retain their ability to filter sediment from upslope disturbances while achieving the goals of the adjacent area.

NOTE: Desired Conditions related to riparian areas are stated under the Management Prescription Area 11 – Riparian Corridors.

Soil Resources

Background

Soils on the Forest are derived from two geographical provinces, the Blue Ridge and the Appalachian Valley and Ridge.

The northern part of the Glenwood-Pedlar Ranger District is located in the Blue Ridge Province and contains soils developed from metamorphic and igneous rock such as quartzite, phyllite, and greenstone. Soils developed from these parent bedrocks are moderately deep (20 inches to 40 inches to bedrock) to deep (greater than 40 inches to bedrock). These soils have moderate-to-severe erosion potential and moderate-to-high productivity levels. The southern slopes of soils derived from quartzite bedrock are low in productivity.

The other three ranger districts are located in the Appalachian Valley and Ridge Province and contain soils that developed from sedimentary rock such as shale and sandstone. Soils developed from sedimentary rock are moderately deep to shallow, less than 20 inches to bedrock. These soils have a slight-to-moderate erosion potential due to the common occurrence of greater than 35 percent rock fragments. North and west slopes are moderately productive. Southeast and southwest slopes are moderate-to-low in productivity.

Many lower slope positions in the Appalachian Valley and Ridge Province contain a fragipan (restrictive layer) two to three feet beneath the surface. The fragipan restricts the downward movement of water and causes a perched water table that produces very wet conditions during periods of high rainfall.

Some of the geology and soils of the Forest have a low buffer capacity against the effects of acid deposition, which has been occurring for decades. These low buffered areas have the greatest risk of becoming increasingly acidic, having greater amounts of aluminum in rooting zones and having stressed ecosystems due to losses of beneficial plant-available soil nutrients.

Desired Conditions for Soils

Forest soils have adequate physical, biological, and chemical properties to maintain or improve vegetative growth, hydrologic function, nutrient cycling and slope stability. Minimal erosion and sedimentation occur due to the successful use of best management practices during forest management activities.

Generally, soils dedicated to growing vegetation have a normal soil profile that is typical for undisturbed soils on similar landforms. This soil profile includes an organic layer of partly to highly decomposed organic litter and humus. This layer is underlain by a layer of mineral soil, which is uncompacted and is darker in color and higher in available plant nutrients than the soil layers below it. Soil compaction does not prevent vegetation to grow. Soils dedicated to growing vegetation which have been altered by past disturbance, are recovering toward a pre-

disturbance condition with vegetative cover. Areas dedicated for other uses, such as campgrounds and system roads and trails, are not contributing above normal amounts of sediment to stream channels. Soil productivity is sustained through nitrogen and carbon fixation, mineral release from weathering parent material, decaying organic matter, and translocation of nutrients.

Forests and streams located in areas of base-poor bedrock and soils are not being negatively affected by acid deposition, particularly sulfates and nitrates.

Air Resources

Background

There are no Class I airsheds on the George Washington National Forest; however, Class I areas near the Forest include the James River Face Wilderness on the Jefferson National Forest and the Shenandoah Park.

The Forest is located downwind of two major areas of coal-fired power generation, the Ohio River Valley and the Tennessee Valley Authority; and within a day's drive of a large percentage of the United State's population and numerous major cities, including Washington DC and Richmond. The heavily traveled Interstate Highway 81 runs through the length of the Forest. Nitrogen oxide, sulfur dioxide and fine particulates are the main pollutants emitted from these sources that are affecting resources on the Forest.

Air quality in western Virginia is currently meeting all National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency. On the GWNF, prescribed burning is the management activity most likely to contribute to air pollution, and current burning levels are not contributing to exceedence of air quality standards. However, prescribed burning levels associated with returning the national forests to more historic fire conditions will require an increase in forest-wide prescribed burn acreages from recent years. This increase was anticipated and the Forest worked with Virginia Department of Environmental Quality (VDEQ) and other state air agencies to incorporate these increases into the emissions inventory used by VDEQ for Regional Haze and Ozone State Implementation Plans. Air modeling analyses out to the year 2018 show that even with the anticipated increase in prescribed fire emissions on the Forest, the state should be able to attain the NAAQS and show reasonable progress in visibility improvement.

Although the NAAQS are not exceeded, the Forest is affected by air pollution; especially sulfur dioxide. Air pollution that originates outside the Forest boundary is transported onto the Forest and contributes to acid deposition and regional haze. In both cases sulfate particles from sulfur dioxide emissions are the primary pollutants of concern. Fine sulfate particles contribute to visibility impairment and stream water acidification. Forest soils can also be affected where high sulfur deposition and sensitive soils/geology coincide. Sulfur deposition has declined over the past 20 years, and this is expected to continue as new pollution control programs are implemented by State and Federal governments. But affected streams do not recover immediately because stored sulfur is slowly released from the soil into the water and acidification continues.

Forests and streams located in areas of base-poor bedrock (sandstone and granite) and with elevations above 3,000 feet are being negatively affected by historic and current levels of acid deposition. This is especially true for spruce-fir forests. The two primary acidifying compounds are sulfates and nitrates. Of those two compounds, nitrate deposition is most important in spruce-fir forests. The sources of acidifying compounds are generally located off national forest lands, with coal-fired electric generation facilities and vehicles accounting for the bulk of sulfur and nitrogen emissions. When nitrogen is deposited in excess of forest nutrient needs, some nitrate will leave the soil and take with it essential nutrients. When nutrients are leached from soils, growth of vegetation can be reduced. Sulfur deposition can cause the same effects on soils when the capacity to absorb sulfur is exceeded. Sulfur and nitrogen compounds in the soil also cause acidification of high

elevation streams, thereby endangering the habitat of native brook trout and other aquatic species. Recent and projected trends in air pollutants show sulfur compound emissions decreasing over the life of the Plan, whereas nitrogen compound emissions are projected to remain relatively flat.

Ozone pollution is negatively affecting the health of sensitive forest tree species, black cherry for example. Ozone is formed through chemical reactions in the atmosphere between nitrogen oxide (from vehicles and coal-fired power generation) and volatile organic compounds (from industrial and natural sources) in the presence of sunlight. Ozone levels are highest during the summer. Recent studies suggest that competitiveness between tree species is changing over time due to elevated ozone levels. Tree species that are not sensitive to ozone will out-compete more sensitive species over time. Significant reductions in ozone pollution over the life of the Plan are not anticipated because nitrogen oxide emissions are not expected to decrease significantly.

Desired Conditions for Air Quality

Visitors to the Forest experience clean air and clear vistas, with recognition that the Forest is affected by human-caused regional haze originating predominantly from pollution sources outside the Forest boundaries.

Activities on NFS lands meet the National Ambient Air Quality Standards designed to protect human health. Forest resources are free of air pollution impacts.

Sulfur and nitrogen deposition decline to levels not harmful to forest resources.

Smoke impacts on the general public and adjacent landowners from prescribed fires are minimal and short-term.

Geological Resources

Background

Geologic materials and geologic processes control or influence a host of ecological factors, such as slope aspect, slope steepness, the areal extent of landforms and associated vegetation, the distribution and composition of soil parent material, the structure and composition of vegetation, the physical character of wetlands, riparian area and stream substrates, the quantity and quality of stream water and groundwater, and some natural disturbance regimes. The diversity of surface geology (bedrock and surface materials; structures, landforms, and dynamic processes acting on the earth's surface) is the foundation for a variety of Forest's ecosystems.

Geologic resources include: groundwater; caves, sinkholes, disappearing streams and other karst features; evidence of climate change, such as Ice Age features; fossils and paleontological resources; volcanic features; unusual landforms; waterfalls; and interesting rocks and minerals. Groundwater-dependent ecosystems are areas where communities of plants, animals, and other organisms depend on access to, or discharge of, groundwater.

Surface geologic processes are a part of the natural disturbance regime in the Forest. These processes include: the erosion, transport and deposition of sediment; mass wasting or landsliding; flooding; changes in stream channels; groundwater flow; and the formation of caves, sinkholes and other karst features.

Geologic hazards are geologic processes that may threaten public safety and damage infrastructure. These include flooding, sinkholes, ground collapse, piping, abandoned mines, groundwater pollution, and a wide range of landslides such as rock falls, rockslides, debris slides, debris flows, slumps, and stream bank failures.

Geologic hazards, such as debris flows, can affect people, infrastructure, and natural resources on and off the Forest.

Desired Conditions for Geological Resources

Geologic resources are identified and managed for educational, interpretative, scientific, scenic, paleontological, ecological, recreational, public uses, historic, and/or archaeological values.

Groundwater is protected. Management activities in karst areas are not adversely affecting groundwater. Groundwater-dependent ecosystems are protected and sustained.

Geologic hazards and potential threats to public safety, buildings, roads, bridges, trails, dams and other facilities are identified and managed. Ground-disturbing activities are not causing or contributing to geologic hazards.

Karst areas are identified and recognized as a geologic-based ecosystem with substantial interaction between surface and subsurface components. Caves, sinkholes and other karst features function to maintain groundwater quality and provide habitat for species that depend on these features.

Management activities are appropriate to the diverse geologic processes, structures, and materials that are the foundation of ecosystems.

Ecological Systems Diversity

Background

Ecosystem diversity is defined as the variety and relative extent of ecological systems including their composition, structure and associated processes. Ecological systems are recurring groups of biological and vegetative communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, geological substrates, and/or environmental gradients. These systems have similar potential and opportunities for management. Vegetation, wildlife, soils, water, geology, climate, fire and other natural disturbances all contribute to ecosystem diversity. By restoring and maintaining the key characteristics, conditions, and functionality of the native ecosystems found on the GWNF to the extent possible, the Forest should be able to sustain ecosystem diversity and also provide for the needs of the diverse plant and animal species on the forest (species diversity). Ecological sustainability in turn supports social and economic sustainability. Ecological systems provide opportunities for nature watching, hunting, fishing, wildflower viewing, and other recreational activities, and support local communities through sustainable forest product yields.

In the abiotic component of ecosystems, geological diversity is the foundation for terrestrial and aquatic ecosystems. The diversity of surface geology (bedrock and surface materials; structures, landforms, and dynamic processes acting on the earth's surface) is the foundation for a variety of Forest's ecosystems.

The Forest's Ridge and Valley sections are long belts of parallel, strike ridges and valleys trending in a northeast direction. A strike ridge is a linear, asymmetric ridge formed by the differential erosion of inclined sedimentary bedrock layers. One flank of the strike ridge is a steep slope cutting across several bedrock layers (antidip or scarp slope). In contrast, the other side of the ridge is a less steep slope conforming to the slope of the underlying bedrock layer (dip slope). The ridges consist of sandstone, shale, and siltstone with the occasional bands of limestone (karst terrain: caves and sinkholes). The valleys are composed of shale and carbonate bedrock (limestone and dolomite karst), creating distinctly different "poor valleys"(less fertile) and "rich valleys" (more fertile). Wide variations in quantity and quality of surface water and groundwater reflect

wide variations in the bedrock: shale, sandstone, limestone. The Ridge and Valley has a trellis drainage pattern. The strike ridge has two distinct drainage systems. The antidip slope has many, closely-spaced, steep, deeply-incised hollows; the dip slope has fewer, widely-spaced, less steep and less incised drainages.

The Forest's Blue Ridge is a massive mountain range dominated by granitic bedrock with metamorphosed sedimentary rocks on the lower slopes of the western flank. Lens of basalt volcanic rocks add to diversity in the granitic terrain. In contrast to the linear bands of alternating bedrock layers in the Ridge and Valley, the massive granitic bedrock in the Blue Ridge forms a broad landscape of more homogeneous bedrock and random landforms. The quantity and quality of surface water and groundwater has less variation in the widespread granitic landscapes, which have a radial and dendritic drainage pattern.

The framework for classifying terrestrial ecological systems was defined using NatureServe's International Ecological Classification Standards (NatureServe 2004a, 2004b) and cross-walked with the Virginia Department of Conservation and Recreation –Division of Natural Heritage Vegetation Community types (see Ecosystem Diversity Report (USDA Forest Service 2009a) and Forest Service FSVeg forest types. Twenty terrestrial ecological systems were identified for the GWNF that represent both major and rare community types and several aquatic systems. The Ecosystem Diversity Report describes the 20 ecological systems in more detail, including the historic range and composition, principal characteristics, performance measures and potential threats for each ecosystem. Since many of the ecological systems have similar key attributes, indicators, species associates and plan components, the twenty ecological systems were combined into nine systems for the analysis documented in Ecosystem Diversity Report and are shown in Table xx. The framework for diversity of aquatic ecological systems is described in the Aquatic Ecological Sustainability Analysis Report.

Table xx. Ecological Systems and Systems Groups

Ecological System Group	Ecological System
Appalachian Spruce-Fir Forest	Central and Southern Appalachian Spruce-Fir Forest
Appalachian (Hemlock)-Northern Hardwood Forest	Appalachian (Hemlock)-Northern Hardwood Forest
Cove Forest	Southern and Central Appalachian Cove Forest
Oak Forests and Woodlands	Northeastern Interior Dry-Mesic Oak Forest
	Central and Southern Appalachian Montane Oak Forest
	Central Appalachian Dry Oak-Pine Forest
Pine Forests and Woodlands	Southern Appalachian Montane Pine Forest and Woodland
	Central Appalachian Pine-Oak Rocky Woodland

Alkaline and Mafic Glade and Barrens	Southern and Central Appalachian Mafic Glade and Barrens*
	Central Appalachian Alkaline Glade and Woodland*
Cliff, Talus and Shale Barrens	North-Central Appalachian Circumneutral Cliff and Talus*
	North-Central Appalachian Acidic Cliff and Talus*
	Appalachian Shale Barrens*
Riparian	Central Appalachian Floodplain
	Central Appalachian Riparian
	Central Interior Highlands and Appalachian Sinkhole and Depression Pond*
	Southern and Central Appalachian Bog and Fen*
	North-Central Appalachian Acidic Swamp*
	North-Central Appalachian Seepage Fen*
Caves and Karstlands	Caves and Karstlands

* The systems with asterisks are considered rare or naturally small in scale

Desired Conditions for Ecological Systems Diversity

Native ecological systems occupy appropriate sites. Native ecosystems sustain strong, resilient populations of associated terrestrial and aquatic species.

There is a mix of closed canopy forest, intermittent canopy, and open canopy conditions. Forest and woodland ecological systems support a diversity of tree ages, from regeneration to old growth, providing a relatively stable mix of ecological conditions across the landscape over time. Openings occur in individual tree-sized gaps and larger. Vegetation structure within patches of regenerating forest and woodland is diverse due to the presence of snags and live overstory trees. These forested systems are dominated by hardwoods, pines, or combinations of both. Non-forested systems are primarily dominated by shrubs, forbs, and grasses. Snags, downed wood, stumps, and other organic matter occur in sufficient abundance to support native species.

Ecological systems are intact and as resilient as possible to absorb negative effects associated with various natural and human-caused stresses. Forest ecosystems are in their

natural state with limited infestations of invasive species to the fullest extent possible. Structural and compositional diversity occurs throughout the forest.

Alkaline Glades and Woodlands and Mafic Glades and Barrens

The alkaline systems consist of woodlands and open glades on thin soils over limestone, dolostone or similar calcareous rock. In some cases, the woodlands grade into closed-canopy forests. Eastern red cedar is often a common tree, and along with chinkapin oak is indicative of the limestone substrate. Warm season grasses such as big and little bluestem are often the dominant herbs; forb richness is often high. The mafic systems found in the Blue Ridge consist of vegetation associated with shallow soils over predominantly mafic bedrock, usually with significant areas of rock outcrops. These areas support a patchy mosaic of open woodland and grassy herbaceous vegetation sometimes with a predominant woody short-shrub community present. The canopy species are species tolerant of dry, shallow soils, most commonly chestnut oak, pines and eastern red cedar. Shrubs may be dense, with species determined by soil chemistry. The herb layer is usually fairly dense and dominated by grasses, both in treeless areas and beneath open canopy. The forbs include species characteristic of other rock outcrops and grassland species, with a smaller number of forest species present.

Edaphic features largely control these areas, but the open nature of the glades, woodlands and barrens continue to be maintained through fire which is operating in its natural regime. Non-native invasive plants are not significant influence on vegetation in these areas. Recreation use is managed so that it does not adversely affect the native vegetation. This system supports populations of associated rare species, including the marsh muhly, stiff goldenrod, drooping bluegrass, tall cinquefoil, and Rand's goldenrod.

Caves and Karstlands

This important ecological system is found to a limited degree on the Forest where it is found associated with carbonate bedrock (limestone and dolostone). This bedrock type is typically found in valleys and has been carved by groundwater. In these areas caves, sinkholes and other karst features occur and function to maintain groundwater quality and provide habitat for species that depend on these features.

Cliffs, Talus, and Shale Barrens

Vegetation on and near shale barrens is mostly classified as woodland, overall, but may include large open areas of sparse vegetation. Dominant trees are primarily chestnut oak, pitch pine, and Virginia pine, although on higher-pH substrates the common trees include eastern red cedar and white ash. Shale barren endemic plants are diagnostic in the herb layer. The substrate includes areas of solid rock as well as unstable areas of shale scree, usually steeply sloped. These systems supports a rare endemic species.

The cliff and talus systems comprise sparsely vegetated to partially wooded cliffs and talus slopes. It consists of vertical or near-vertical cliffs and the talus slopes below. In some cases, this system may take the form of upper-slope boulderfields without adjacent cliffs, where talus forms from freeze/thaw action cracking the bedrock. Most of the substrate is dry and exposed, but areas of seepage are often present. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places.

Edaphic features largely control these areas, but the open nature of the talus and edges of shale barrens continue to be maintained through fire which is occurring in its natural regime. Non-native invasive plants are not a significant influence on vegetation in these areas. Recreation use is managed so that it does not adversely affect the native vegetation. This system supports populations of associated rare species, including the shale barren rockcress, Millboro leatherflower, shale -barren blazing star, shale-barren evening primrose, Appalachian grizzled skipper, bristly sarsaparilla, chestnut lipfern, mountain sandwort, Canby's mountain lover, three-toothed cinquefoil.

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Cove Forest

These closed-canopy forests are found concave landforms and often associated with riparian areas. Overstories are typically dominated by yellow poplar, hemlock, birch, magnolia, basswood, and red maple.. Midstories are well developed and fairly diverse in acidic coves rhododendron is often abundant. Understories have a well-developed herb layer, often very dense and usually high in species richness, and it is present in all but the acid coves. Well-developed and fairly diverse subcanopy and shrub layers are often also present in all but the acid coves.

This system supports populations of associated rare species, such as ginseng. Regenerating forests (0-10 years old) comprise from 3 to ten percent of system acreage. Mature forests (60 years old or older) comprise approximately 60 to 70 percent of system acreage. Fire is not a major disturbance in this system and typically occurs only in driest of conditions. Open canopy structure is present on only about 3 to 10 percent of the area. On the Forest this type is interspersed with the oak dominated systems. Cove forests often occupy land along riparian areas and adjacent to upland system.

Northern Hardwood Forests

Usually found in the highest elevations on the Forest this forest is dominated by overstories that include American beech, sugar maple and yellow birch with some eastern hemlock. Midstories and understories are usually well developed. The understory varies quite a bit, in some places dominated by evergreen shrubs and in others by herbs. Regenerating forests occupy from 5 to 15 % of the area. Mature forests make up 45 to 55 percent of the area. Since these sites are predominantly high elevation and moist, fire is not a major disturbance mechanism. Weather events such as high wind, ice, heavy wet snow, and the combinations of these account for most disturbances where open canopies exist in about 10 percent of the area.

Oak Forest and Woodlands

This is the most common ecological system on the Forest and can be viewed as the matrix forest in which the other types exist. Overstories are typically dominated by red oak, white oak, chestnut oak, black oak and scarlet oak. Heath shrubs such as blueberry, huckleberry and mountain laurel are common in the understory and often form a dense shrub layer. Regenerating forests (0-10 years old) comprise from 3 to ten percent of system acreage. Mature forests (60 years old or older) comprise approximately 60 to 70 percent of system acreage. Fire is a very important component of this system and results in open canopy structure on about 43 to 53 percent of the area. In many of the woodland areas native grasses are common.

Pine Forests and Woodlands

Next to Oak Forest and Woodlands this ecological system is the most common on the Forest and occupies the upper slopes and south to west exposures. Overstories are typically dominated by table mountain pine, pitch pine, and some Virginia pine along with dry site oaks such as chestnut oak, scarlet oak, and bear oak. A dense heath shrub layer is almost always present. Mountain laurel is the most typical and dominant, but species of blueberry and huckleberry along with fetterbush may also be dominant. Native grasses and sedges are common along with dry site herbs and forbs. Their density varies depending on shrub cover. Regenerating forests (0-10 years old) comprise from ten to twenty percent of system acreage. Mature forests (60 years old or older) comprise approximately 35 to 45 percent of system acreage. Frequent fire occurring about every 3-9 years is a very important component of this system and result in open canopy structure on about 30 to 40 percent of the area.

Spruce-Fir Forests

Found only in the higher elevations near West Virginia this system is a predominately mature or old-growth forest with a diversity of vertical and age structure on sites to which this species is appropriate and of historical occurrence. Overstories are typically dominated by red spruce (while the name of this system includes the word "fir", fir does not occur in the occurrences of this type on the Forest). This system grades into northern hardwoods and often other tree species found with red spruce include American beech, yellow birch, and sugar maple. The herbaceous layer is most typically dominated by mosses, ferns, sedges, and forbs, This system supports populations of associated rare and sensitive species, including the West Virginia northern flying squirrel. Regenerating forests (0-10 years old) comprise less than 5% percent of system acreage and is generally in small canopy gaps. Mature forests (60 years old or older) comprise approximately 70 percent of system acreage. Fire is rare in this system and the canopy is predominantly closed.

Riparian

Riparian Areas are functionally defined as areas with three-dimensional ecotones of interaction that include both terrestrial and aquatic ecosystems. They extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain into the water, laterally into the terrestrial ecosystem, and along the watercourse at a variable width. The riparian corridor has distinctive suitable uses and standards so this ecological system is managed specifically through management prescription area 11 – Riparian Corridors.

Species Diversity

Background

Maintaining a diversity of habitats for all species on the GWNF, especially threatened or endangered species, and enhancing wildlife habitat are important desired conditions. A diversity of plant and animal species is part of our natural heritage and provides forest visitors the opportunity to recreate in natural settings, view and study nature, hunt and fish. Forest lands serve as refuges for threatened, endangered and rare species, offer large contiguous forested areas where animal species can successfully reproduce and rear their young, offer key rest and feeding areas for migratory bird species, and provide important linkages (travel corridors) between State, Federal and other blocks of forested land.

In developing a strategic plan for species diversity, the GWNF developed the Species Diversity Report (USDA Forest Service 2009b) as a supplement to the Ecosystem Diversity Report (USDA Forest Service 2009a), which describes how the ecological characteristics for ecosystems on the George Washington National Forest (GWNF) were identified and incorporated into the plan components of this Plan. A similar analysis process was also used to assess species diversity. Federally threatened and endangered species (T&E), sensitive species, locally rare species and other species with management concerns (e.g., demand species) were identified.

There are eight species listed by the Department of Interior, U.S. Fish and Wildlife Service as federally threatened or endangered that have been documented on the Forest. These eight species are further described in Table xx.

Table xx. Federally Threatened and Endangered Species for the GWNF

Taxa	Species	Status

Taxa	Species	Status
Mammal	Indiana Bat (*Myotis sodalis*)	Endangered
Mammal	Virginia Big-Eared Bat *(Corynorhinus townsendii virginianus)*	Endangered
Mussel	James Spiny Mussel (*Pleurobema collina*)	Endangered
Vascular Plant	Shale Barren Rock Cress (*Arabis serotina*)	Endangered
Vascular Plant	Smooth Cone Flower (*Echinacea laevigata*)	Endangered
Vascular Plant	Virginia Sneezeweed (*Helenium virginicum*)	Threatened
Vascular Plant	Swamp Pink (*Helonius bullata*)	Threatened
Vascular Plant	Northeastern Bulrush (*Scirpus ancistrochaetus*)	Endangered

Management Indicator Species

Management Indicator Species (MIS) have been chosen to represent: threatened and endangered species; species with special habitat needs; species commonly hunted, fished, or trapped (demand species); non-game species of special interest; and species that indicate effects to major biological communities. Specific habitat objectives related to these species are located in several places throughout this Forest Plan. Table xx provides a guide for locating these objectives. The monitoring program outlined in Chapter xx contains specific objectives for these management indicator species.

Species Common Name	Category (s)
Cow Knob Salamander	T/E/S Indicator, Special Interest Species Indicator
Pileated Woodpecker	Special Habitat Indicator
Ovenbird	Special Habitat Indicator
Chestnut-sided Warbler	Special Habitat Indicator
Acadian Flycatcher	Special Habitat Indicator
Hooded Warbler	Biological Community Indicator
Scarlet Tanager	Biological Community Indicator
Pine Warbler	Biological Community Indicator
Eastern Towhee	Biological Community Indicator
Wild Trout	Biological Community Indicator, Demand Species Indicator
Eastern Wild Turkey	Demand Species Indicator
Black Bear	Demand Species Indicator
Deer	Demand Species Indicator

Desired Conditions for Species Diversity

Natural ecological communities exist in amounts, arrangements, and conditions capable of supporting native and desired non-native species within the planning area.

Natural disturbances, such as fire, wind, insects and diseases, ice storms, and floods, modify the landscape, providing habitat for disturbance dependent species.

Beaver activity creates wetland mosaics that contribute to community and species diversity and provide high quality wildlife viewing opportunities.

Diverse habitats exist that range from early successional forests to late successional forests, in both open and closed overstory conditions. These early, late, closed, and open conditions will provide habitat structure for a wide range of native plant and animal species. Diverse

habitat is provided for known populations of threatened and endangered species, sensitive species and locally rare species on the Forest.

Threatened and endangered species are recovered or moving towards recovery. Risks and threats are reduced or eliminated, especially during critical life stages such as nesting or rearing. The potential for sensitive species to become listed as threatened or endangered is reduced.

Breeding, wintering, migration, staging and stop-over diverse habitats for migratory birds are provided in ways that contribute to their long-term conservation.

Habitat is provided for species requiring a mosaic of forest types and structures for their life cycle needs, including black bear, ruffed grouse, wild turkey, and white-tailed deer. Larger areas of early successional habitat in the form of old fields, wildlife openings, pastoral areas, and regeneration areas provide habitat for species such as yellow-breasted chat, northern bobwhite, prairie warbler, white-eyed vireos, golden-winged warbler, and cotton-tailed rabbits. Habitat is also provided for species associated with areas of mid- to late-successional forests. In cove and mesic hardwood/pine forests, with predominantly closed canopies, species needing large areas of mature trees with some level of overstory structural diversity (canopy gaps) are present, including cerulean warblers, worm-eating warblers, wood thrushes, hooded warblers, pileated woodpeckers, woodland salamanders, and eastern gray squirrels. In mature mesic and xeric pine/hardwood open woodlands, with a mosaic of grass/forb/shrub understories, species needing large areas of both mature trees and an open structure are present, including golden-winged warblers, whip-poor-wills, scarlet tanagers, eastern wood pee-wees, northern flickers, Indiana bats and other tree and cave bats, fox squirrels, and timber rattlesnakes near rock outcrops. In addition, xeric pine/hardwood open woodlands provide habitat for post-breeding and migratory stop-over needs for birds species normally associated with forest interior habitat for breeding. Open oak woodlands near riparian areas and in valley bottoms provide habitat for species such as fox squirrels, woodcock, and wood turtles.

Water sources for wildlife, including ephemeral ponds for herpetofauna, are present.

Some roads are seasonally inaccessible to public travel to protect physical and biological resources and wildlife habitat.

Snags, downed wood, stumps, and other organic matter occur in sufficient abundance to support native wildlife species.

A combination of both dense shrub and relatively open understories exist across the landscape. Areas of blueberries, huckleberries, mountain laurel, and rhododendron are present. Hollow trees suitable for cavities and dens plus standing dead trees are common throughout the area.

Early-successional habitat in the 2100 to 4000 foot elevation range for species like the golden-winged warbler is present in the form of open woodlands, regenerating forests, old fields, and utility rights-of-way. Many patches of these habitats are clustered on the landscape to provide habitat for area-dependent or area-sensitive species.

A blight-resistant American chestnut (*Castanea dentata*) returns to the Forest as a dominant species.

Watersheds with known populations of wood turtles are managed to maintain or enhance the terrestrial summer foraging habitat, nesting habitat and overwintering habitat of wood turtles. Human interactions, such as motorized vehicle use and recreation, are managed to minimize impacts to wood turtles.

Old Growth

Background

The amount and distribution of old growth forests on the GW is most influenced by management activities associated with timber harvesting. Natural disturbances, such as strong winds, large accumulations of ice, native insects (gypsy moths) and disease, fire (wildland and prescribed), and landslides, also affect old growth forest conditions, but they are regarded as being within the natural range of variability for forest successional dynamics. No plant or animal species in the Appalachians are known to require old growth forest conditions exclusively (i.e. are "old growth obligates") for their survival or continued existence (NatureServe, VDGIF 2005, WVDNR 2005, VDCR-NH). Mature or late seral forests are considered to be those forests that are in the later stages of succession and are generally synonymous with old growth. Old growth forests are distinguished by not only old-age trees but also related structural attributes within the forest stand. The age at which a stand develops old growth attributes varies according to forest type (determined by dominant tree species) and reflects climate, site conditions (bedrock geology, soil type, aspect, moisture regime, elevation), and disturbance regime. The definitive characteristics for the different old growth forest types is contained in the document, "*Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region, Forestry Report R8-FR 62"* and "*Information about Old Growth for Selected Forest Type Groups in the Eastern United States, General Technical Report NC-197*."

Desired Conditions for Old Growth

A well-distributed and representative network of large, medium, and small old growth patches is provided over time for biological and social benefits. These patches are expected to be embedded in a forest matrix dominated by mid and late successional forests. Old growth areas are generally interconnected by mature forests.

On about xx,xxx acres of wilderness and recommended wilderness, natural processes will determine the type of vegetation and structure of the old growth community. These landscapes feature a structurally diverse older aged forest community with occasional gaps created by disturbance events such as storms, insects, diseases, landslides, or fire. These areas provide old growth characteristics in large blocks of land and contribute habitat for late successional, mature forest terrestrial and avian species.

On about xxx,xxx acres of the forest managed for backcountry recreation, predominantly natural processes will determine the type of vegetation and structure of the old growth community, though these areas will provide some additional areas of open woodland habitat since fire regimes will be within their historical range. These areas provide old growth characteristics in large blocks of land and contribute habitat for late successional, mature forest terrestrial and avian species.

On the remainder of the forest, old growth will be dispersed in medium and small patches.

Forest Disturbances

Background

There are a number of forces that lead to forest disturbances. Some are a direct result of human activities, such as the introduction or spread of nonnative organisms and wildland fire. Some are indirectly related to human activities, such as climate change. Still others result from such forces as extreme weather events. Disturbances may have positive impacts on various ecosystem components such as creation of canopy gaps for natural regeneration or input of woody material into the soil nutrient cycle or aquatic habitats. Yet the scale of some forest disturbances can be such that desired conditions for the geographic area or adverse impacts to

some ecosystem components are significant. This includes the social and economic ecosystem components as they relate to capturing some value from damaged or dying forests. Regardless of the cause of the disturbance, full consideration of both the beneficial and negative impacts of the disturbance on the ecosystem and desired conditions for the area should be considered in determining a response, or lack of response, to a given disturbance event. As stated elsewhere in this document, the overarching principle will be to foster a resilient and healthy, primarily forested ecosystem better able to absorb or survive through these disturbance events. The disturbances for discussion here include: nonnative invasive plants, insects, disease and nonnative invasive aquatic species.

The high percentage of forest communities aged 80-110 years old pose significant challenges in addressing forest health issues. These large areas of uniformly aged forests are particularly vulnerable to both native and non-native forest pest epidemics. Integrated Pest Management (IPM) principles are used during site-specific analysis. IPM is a decision-making and action process, which includes biological, economic, and environmental evaluation of host-pest systems to manage pest populations. IPM strategies involve a comprehensive systems approach to silvicultural, wildlife, fuel treatment, recreation and corridor management practices that emphasizes *prevention* of pest problems.

Insect and disease organisms are a significant component of forest ecosystems. Native organisms contribute to many ecological processes of forests including nutrient cycling, plant succession, and forest dynamics. In most cases, these native organisms are recognized as an integral component of forest health. In a few instances, however, these organisms cause unacceptable resource damage or loss, and negatively affect ecological, economic, or social values. In these cases, the organisms causing the damage are referred to as pests. Significant native insect pests on the George Washington National Forest include the southern pine beetle and a variety of defoliators. Significant native disease problems include oak decline, shoe-string root rot, and a variety of other decay organisms affecting living trees.

Throughout the past 100 years, a variety of insects, diseases, and plant species have been introduced to the United States and spread into the George Washington National Forest. These non-native organisms often are considered pests because they have no natural enemies or other naturally controlling agent and their unchecked spread can wreak untold damage to native ecosystems and forest communities. The chestnut blight has reduced the American chestnut from the predominant tree species on the George Washington to a minor understory component of today's forests. Other significant non-native pests include the gypsy moth, the hemlock wooly adelgid, beech bark disease, butternut canker, and dogwood anthracnose.

The Central Appalachian occurrences of the montane spruce-fir forest community are confined to the highest peaks of Maryland, West Virginia, and Virginia. Stresses are exacerbated by additional stresses of acid precipitation and high recreation pressure. Spruce-fir communities support several rare terrestrial wildlife species, including the sensitive subspecies of northern flying squirrel. Restoration centers on increasing stand structural complexity and enhancing the stocking of red spruce through the release of spruce saplings from the understory of northern hardwoods, planting seedlings in open areas, and promoting natural reforestation of open areas. The Forest will cooperate in efforts to minimize adverse effects of acid precipitation spruce-fir communities and develop cooperative relationships with private landowners to maintain or establish habitat corridors between patches of spruce-fir habitat.

Nonnative Invasive Plants (NNIP)

Nonnative invasive plants are introduced species that can thrive in areas beyond their natural range. These plants are characteristically adaptable, aggressive, and have a high reproductive capacity. Their vigor combined with a lack of natural enemies often leads to population outbreaks. While not all nonnative species are known to disrupt native ecosystems, of particular concern are those that are successful at invading and rapidly spreading through natural habitats. Numerous NNIP have been documented across the George Washington National Forest and many infested sites present an immediate threat to natural communities, rare species sites, and other sites of high public interest. Given the current known distribution of NNIP on the George Washington National Forest, there is a need to implement an integrated program of NNIP control to

protect forest resources. Management of NNIP infestations would also help prevent the George Washington National Forest from becoming a source of infestations for surrounding lands, both public and private, and would help slow the spread of NNIP in the central Appalachian region. The list of NNIP species affecting the Forest is fairly long and getter longer as new plants are introduced, either accidently or through the nursery trade. Some of the NNIP species currently of highest concern on the Forest include Japanese stiltgrass, autumn olive, garlic mustard, tree-of-heaven, multiflora rose, oriental bittersweet, bush honeysuckle, Japanese knotweed, and spotted knapweed.

Category 1 Species are non-native plant species that are known to be invasive and persistent throughout all or most of their range within the Southern Region. They can spread into and persist in native plant communities and displace native plant species, therefore posing a demonstrable threat to the integrity of the natural plant communities in the Region. Category 2 Species are non-native plant species that are suspected to be invasive or are known to be invasive in limited areas of the Southern Region. Category 2 Species will typically persist in the environment for long periods once established and may become invasive under favorable conditions. Plant species in Category 2 pose a significant risk to the integrity of natural plant communities throughout the Region or in parts of the Region. The Forest will strive to minimize negative effects of non-native invasive species and control such species where feasible and necessary to protect national forest resources.

NNIP species are present on the Forest, with existing infestations increasing in size. New infestations and new NNIP species are likely during the life of the Plan. Prevention of new infestations is important, as is control of existing infestations. Before management activities take place it is important to identify potential NNIP threats and develop a control/eradication plan that includes follow up monitoring of any NNIP treatments for effectiveness.

Travel corridors are routes for human travel as well as NNIS invasions. Humans act as vectors for plant propagules, insects, and diseases in a variety of ways: through clothing, boots, pets, vehicles, firewood, and dumping of vegetation. Travel corridors include roads for vehicles, foot trails, and streams. The location of heavily used Interstate 81 along the length of the Forest brings with it the potential to introduce NNIP, as well as other invasive organisms, from locations far away. Streams may facilitate NNIS movement through human action or by carrying propagules downstream.

Disturbed areas include a variety of places where the vegetation has been altered and the soil exposed. These sites can arise through natural processes, such as landslides, insects and diseases or wildfires, or through human activities, such as mining, road and trail construction and maintenance, illegal dumping, and prescribed burning.

Management of non-native invasive species will focus on four components: 1) prevention of new infestations; 2) elimination of new infestations before they become established; 3) containment or reduction of established infestations; and 4) reclamation of native habitats and ecosystems. Integrated pest management approaches are used in all four of these components.

Native and Nonnative Invasive Insects, Diseases and Aquatic Species

The Forest will contribute, whenever possible, to research aimed at suppression of hemlock wooly adelgid, beech bark disease, dogwood anthracnose and other introduced significant non-native invasive pest problems.

Some of the current species of concern include:

Didymo (*Didymosphenia geminata*) is a freshwater diatom (type of alga) that can form massive blooms on the bottoms of streams and rivers where it attaches itself to the streambed by stalks. These stalks can form a thick brown mat that smothers rock, submerged plants and other materials. Dawn has a better paragraph

Gypsy moth (*Lymantria dispar* (L.)) The gypsy moth is a non-native insect defoliator that favors many deciduous tree species, primarily oak. The abundance of oak species throughout the forest makes the George

Washington National Forest prime habitat for the gypsy moth. The mature and overmature state of these oak forests over a vast majority of the Forest results in high probabilities of severe mortality and loss of hard mast production over time.

Hemlock woolly adelgid (*Adelges tsugae*)- Is a non-native aphid like insect that infests hemlock. The insect feeds on the sap of the tree at the base of the hemlock needles. Infested trees decline over a few years and eventually die. Most of the Forest is generally infested and severe mortality has occurred in the hemlock stands found predominantly along our creeks and streams. Indirectly, the loss of hemlock in these riparian ecosystems poses a threat to aquatic organisms of all sorts due to increased sunlight and warming of stream temperatures.

Southern Pine Beetle (*Dendroctonus frontalis*) – Is a native bark boring insect that attacks primarily yellow pines (shortleaf, pitch, and Virginia pines on this Forest). However, it can also infest white pine and even red spruce. Although a native insect, populations can reach outbreak proportions causing undesirable widespread mortality in pine ecosystems.

Emerald ash borer (*Agrilus planipennis*) Is a non-native borer that attacks ash species. Although this recently introduced pest is not known to occur on the Forest, it has been identified in areas of Virginia and West Virginia. The insect can cause severe mortality of ash. Although this Forest does not have a large ash component, this insect pest is still of great management concern due to uncertainty of the extent of mortality this pest could cause (e.g. elimination of all ash from our ecosystems).

White-nose Syndrome – language to come.

Desired Conditions for Native and Nonnative Invasive Species

A forest environment is provided where damage to natural resources from forest pests (any native or nonnative invasive species including plants, animals, insects, and/or diseases) are minimized when such damage prevents the attainment of other natural resource objectives.

New introductions of invasive species are prevented.

New invasive species infestations are promptly detected and eliminated before establishment.

Existing infestations of targeted invasive species are eradicated, controlled or contained.

Ecosystems impacted by invasive species have been effectively restored or rehabilitated to desired conditions and to conditions that reduce vulnerability to invasion or reinvasion by invasive species.

Healthy native ecosystems, such as oak-hickory or hemlock forests, are maintained or restored such that nonnative organisms do not adversely impact the function of ecosystem processes.

The integrity of rare natural communities is protected from nonnative invasive plant species such as ailanthus (tree of heaven), kudzu, multiflora rose, and autumn olive. Nonnative invasive plants are not a demonstrable threat to the integrity of other natural communities.

Fire

Background

Fire played a major role in shaping vegetation communities in the Appalachian Mountains. Of all the natural disturbances that influence and shape ecosystems in our area fire is perhaps the one humans have had the most influence over, both in suppressing and causing. Fires in our area that result from human ignitions have

two seasonal peaks, the highest one in April and a lower one in November. These months correspond with weather and fuel conditions that are conducive to easy fire ignition and spread (dry, low humidity, and windy). Lightning caused fires begin in April and peak from May to July then taper off in September. Most fires are the result of human ignitions, but lightning caused fires range from 12% to almost 45% depending on weather and fuel conditions.

Recent studies on the Forest and elsewhere in the Appalachians have studied the historic role of fire in our ecosystems. By examining basal fire scars in tree trunks using dendrochronology (study of tree rings) and microscopic charcoal in bog and pond sediments it has been shown that fire was widespread and occurred frequently across our landscape. For example fire scar/tree ring studies at eight sites on or near the Forest show fires occurring at a frequency of approximately 3-9 years from the earliest chronology dates in the mid-1600s to mid-1700s and continued until the 1930s when fires ceased due to effective suppression strategies.

A fire regime is the pattern, frequency, and intensity of fire that prevails in an area. While fires may have been frequent on the landscape they do vary greatly in their intensity and effects within and between vegetation types. The drier ridgetop and south to west facing slopes typically dominated by pine and some oaks had the most frequent and intense fires while the cove and riparian areas with species such as yellow poplar and hemlock had less frequent and very low intensity fires. Typically fires on the upper drier slopes would be extinguished as they burned into the cool moist areas in coves and along streams. Generally speaking across the Forest approximately 80% of the acreage had fairly frequent fire while 20% had infrequent and low intensity fire based on forest types.

Fire management strategies support a variety of desired conditions and objectives across the GWNF (see previous sections on ecosystem diversity and species diversity). The fire program includes response to unplanned ignitions (i.e. wildfires both human caused and lightning) as well as the use of periodic planned ignitions (i.e. prescribed burning) to reduce risk of damaging high intensity fires, reestablish historic fire regimes, and restore native ecosystems along with the plant and animal species those conditions support. Above all else in the management of fire is the priority given on firefighter and public safety.

Desired Conditions for Fire

Wildland Fire:

The forest, influenced by both past climatic and human forces, is a forest with diversity and flexibility that is well-adapted to fire occurrence. Various oak species and yellow pines continue to be major components.

Wildland fire that results from natural ignitions (lightning) functions, as nearly as possible, in its natural ecological role, while life and property (public and private) are protected and critical resource values, including soil, air, and water quality, are maintained.

The risk of losing key ecosystem components from the occurrence of high severity wildland fire remains relatively low.

Prescribed Fire:

Fire is used in a controlled, well-planned manner to manage vegetation, restore fire-dependent ecosystems, create wildlife habitats conditions, reduce uncharacteristic fuel loads resulting from extended absence of fire and/or tree mortality from non-native insects and disease.

Prescribed burning occurs under certain preplanned conditions, considering social concerns with smoke management, public health and safety, and welfare of property.

Recreation, Scenery and Heritage Resources

Recreation

Background

Recreation has been a significant offering of the George Washington National Forest since its designation. Outdoor enthusiasts were drawn to the vast forested lands of the national forest for hunting, fishing, hiking and horseback riding, and later mountain bicycling. As these different user groups demanded additional opportunities, the trail network on the National Forest exploded until it topped 1,000 miles. By the time of the last Plan Revision (1993), the Forest could no longer meet demand for single use trails and, with few exceptions, designated all trails as non-motorized, multiple-use trails. Since then, the various user groups and volunteer organizations have made significant strides in cooperating in their use and maintenance of these trails.

The primary exception to multiple use is the Appalachian National Scenic Trail. It was Congressionally-designated as hiker only. For policy development and maintenance of the "AT", there is a cooperative management system comprised of the federal land managing agencies, the Appalachian Trail Conservancy, and the individual volunteer trail clubs. The AT has a reputation throughout the world as a premier long-distance hiking trail and serves as a model for successful partnerships.

The George Washington National Forest is also a provider of some of the most primitive, dispersed recreation in Virginia. There are six designated Wildernesses and additional remote backcountry area outside of Wilderness. In these areas, users can find solitude and must rely heavily on their own outdoor skills and abilities.

On the other end of the spectrum, the George Washington National Forest offers numerous frontcountry, developed recreation opportunities. After several recreation areas were constructed by the Civilian Conservation Corps, some of which are still enjoyed today, the developed recreation program really took root. Since that time, developed recreation has grown to include family campgrounds, group campgrounds, equestrian campgrounds, family picnic areas, group picnic areas, swimming beaches, boat ramps and launches, interpretive sites, and a designated Forest Service Scenic Byway.

The demand for outdoor recreation opportunities and facilities outweighs the Forest's supply. Improvements or expansion of existing recreation facilities and trails, and proposals for new facilities and trails, are screened and analyzed not only against the capability of the physical environment, but also the Forest's financial capability to maintain and sustain its massive recreation program.

Desired Conditions for Recreation

The Forest provides spectacular scenery, unique ecosystems and good access for the American public to use and enjoy the resources and opportunities available. The Forest provides escapes from the urban environment and the rural lands are the "backyard" playgrounds and tourism attractions for many smaller communities. A spectrum of high quality, nature-based outdoor recreation opportunities that reflect the exceptional resources of the Forest and interests of the recreating public are provided in an environmentally sound and financially sustainable basis. The rugged mountain landscape makes premier sightseeing and trail use the focus of recreation.

Recreational activities contribute to the sustainability of the social and economic values of local communities.

Infrastructure (Interstates; the Blue Ridge Parkway; roads; trails, including the Appalachian National Scenic Trail) facilitates access appropriate for the recreation opportunity setting.

Seasonal flora, waterfalls, streams, and lakes, wildlife, and pristine scenery set the stage for a wide availability and variety of quality outdoor recreation experiences. Lakes, streams, upland forests, and historic sites provide the attraction for day and overnight camping visits by urban recreationists.

Most of the Forest provides the opportunities for hunting, fishing, camping, and other quality outdoor dispersed recreation experiences. There are many opportunities for visitors to learn about natural and cultural resources and how to recreate responsibly.

A variety of motorized and non-motorized recreation opportunities are available at different levels of challenge.

Solitude and primitive recreation experiences are available in wilderness and remote backcountry settings and offer physical challenges with minimal human encounters.

The general forest area provides a variety of dispersed recreational opportunities (hunting, fishing, driving for pleasure, nature viewing, trails use, etc.). The setting is generally natural appearing, although forest management activities are present. Game and non-game wildlife populations are abundant and support viewing, photography, nature study, and hunting. Many areas of solitude and quiet are found.

Recreation Settings (Recreation Opportunity Spectrum)

Background

Desired Conditions for Recreation Opportunity Spectrum Settings (ROS)

The Forest offers a variety of recreation opportunity settings ranging from the highly developed to remote.

The semi-primitive classes are characterized by predominantly natural or natural-appearing landscapes. The size of these areas gives a strong feeling of remoteness. Within these settings, there are ample opportunities to practice wildland skills and to achieve feelings of self-reliance. There are two classes within the semi-primitive settings: non-motorized and motorized. These labels do not relate to the type of recreation, but rather to the density of, or distance from, roads. In these semi-primitive settings, the primary mode of travel is foot, mountain bike or horse.

For a semi-primitive non-motorized recreational opportunity (SPNM), the area is remote. Visitors feel that they are removed or at least distanced from the sights and sounds of human activity. Visitors experience solitude and serenity as well as opportunities for self-discovery, challenge and risk-taking. Access to this area is difficult where travel is by animal or is human-powered. Few opportunities for social interaction exist. Visitors rely on their own backcountry skills and abilities. Other than trails, no facilities are provided for the comfort and convenience of visitors. The land provides a high degree of naturalness with little or no evidence of human-made changes to the environment. Wilderness areas and backcountry recreation areas provide most of the SPNM experience. The area has high probability of isolation from sights of human activities though an occasional road, power line, or evidence of vegetation manipulation may be seen.

For a semi-primitive motorized recreational opportunity (SPM), motorized access by the public is highly restricted or nonexistent. Existing roads are maintained and infrequently used, primarily for administrative purposes. Opportunities to practice wildland skills and to achieve feelings of self-reliance exist. Public access is primarily by foot or animal, thereby providing a degree of challenge, risk and self-reliance. The area has high probability of isolation from sights of human activities though an occasional road, power line, or evidence of vegetation manipulation may be seen. Visitors perceive themselves as removed from human activities and experience feelings of solitude and serenity, but occasional distant sounds may be heard. The likelihood for meeting other recreationists is low. Visitors may see gated roads or tank traps to regulate access into an area. Other than trails, recreation facilities are rare, limited to resource protection needs and designed to be unobtrusive on the landscape. The area can have a high degree of naturalness. Remote backcountry areas provide a large component of SPM experience, but much of the SPM experience is spread throughout the Forest.

For a roaded natural (RN) recreational opportunity, the area is characterized by predominantly natural appearing landscapes with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Motorized access is available. On or near motorized travelways, other national forest visitors may frequently be encountered due to concentrated use. As recreationists move away from motorized travelways within the RN areas, there is about equal probability to see other individuals or groups as to experience solitude. There are ample opportunities to have a high degree of interaction with the natural environment.

RN areas often take on a mosaic of development from highly modified areas to pockets of unmodified lands. Developed recreation sites such as campgrounds, picnic areas, shooting ranges, boat launches, trailheads, and interpretive sites may be present within this setting for the enhancement of the visitors' recreational experience or the protection of the site and resources.

For a rural recreational opportunity (R), these areas are substantially modified although they do have natural appearing elements. Facilities are typically designed for a large number of people and roads are generally paved. Sights and sounds of other people are readily evident. The landscape is often dominated by human-caused geometric patterns; open spaces may dominate the landscape. Facilities are developed for user comfort such as pavement on roads and trails, and convenience amenities within campgrounds. Common facilities within this setting would be developed campgrounds day use facilities, interpretive sites and administrative facilities. Opportunities for solitude, challenge and risk are generally low.

Non-Motorized, Dispersed Recreation (Trails)

Background

The George Washington National Forest is becoming an increasingly urban forest. In such close proximity to numerous cities (including Washington, DC, and northern Virginia), towns, colleges and universities, as well as smaller communities, this national forest is uniquely located to serve many people from all walks of life and with various recreation preferences.

Each trail user group has expressed desire, and demand, for more miles of their respective favorite trail use, whether motorized or non-motorized, hiking, mountain biking or equestrian trails. During the 1993 Forest Plan process, it was determined that there are not enough acres or human resources available to meet the demand for single use trails. Therefore, the vast majority of the trails on the national forest was, and continues to be, designated as multiple or shared use trails. There are exceptions, of course, such as the hiker-only Appalachian National Scenic Trail, highly developed interpretive trails, and trails where resource damage or potential damage is a concern. Also, all-terrain vehicles are restricted to the three designated motorized trail

areas on the GWNF (See management prescription area 7C).

Over the last 16 years, the various user groups have, for the most part, embraced the shared use trail systems. Some volunteer organizations with different recreation preferences now work cooperatively to get projects done and obtain grants for trail maintenance. By sharing trails, each non-motorized user group can enjoy hundreds of miles of trails within the national forest.

The George Washington National Forest currently has XXX miles of system trail. Forest Service trails are categorized by the intended maintenance level. A primitive trail is maintenance level 0 or 1 and may appear to be not much more than a deer path. The range goes up to maintenance level 5 which would be a relatively short paved trail that offers interpretive signs. The majority of trail miles fall in the 2-4 maintenance level range.

Desired Conditions for Non-Motorized Dispersed Recreation (Trails)

The Forest provides trail opportunities for varied interests and skill levels from quality day trips to long distance backpack or saddlepack trips. The trail program is managed from a forest-wide perspective and opportunities are offered where they are most responsive to demand, minimize conflicts between recreation user types, and can be managed in an environmentally sustainable and operationally efficient manner.

Trails are provided across all Recreation Opportunity Spectrum classes that are found on the forest. A range of trail difficulty levels, easy to most difficult, exists as terrain and intended maintenance levels dictate. Visitors have choices between using a high maintenance level trail near the “front country”, a primitive low maintenance trail in the “back country”, or a trail in the middle of the range.

Trails are provided for non-motorized uses such as hiking, horseback riding, mountain biking and hunting and fishing access; and trails are provided for motorized uses such as all-terrain vehicles and motorcycles. Use of motorized trail vehicles, such as all-terrain vehicles and motorbikes, are restricted to designated trails. Motorized trails are open to non-motorized uses.

When visiting a high maintenance level trail, the presence of other visitors is high. There are restroom facilities for the comfort of visitors. An information kiosk or bulletin board as well as other on-site signs provide clear directions to and along the trail as well as interpretive messages. Maintenance level 5 trails are accessible to all users. The trail difficulty rating is easy. There is little or no need to have special outdoor skills prior to using these trails.

When visiting a moderate maintenance level trail, there may be some encounters with other visitors, primarily at or near the trailhead. A vault toilet facility is provided at the trailhead only if needed for the protection of resources. Information boards at trailhead parking areas give some directional signs. Few signs exist along the trail to assure users they are still on the correct trail, to provide directions at an intersection with another trail or a road, and to give mileage to a destination. Blazes are painted along the route to help visitors follow the trail. The trail difficulty rating can range from easy to difficult. Users will be challenged and need to rely on their outdoor skills for trails rated moderate or difficult.

When visiting a low maintenance level trail, there will be few if any encounters with other visitors. A vault toilet facility is provided at the trailhead only if needed for the protection of resources. Information boards at trailhead parking areas give some directional signs, but few if any signs exist along the trail, primarily just at intersections. In non-Wilderness areas, trails are blazed. The trail difficulty rating is moderate to difficult. Visitors are afforded the opportunity to be self-reliant on their outdoor skills in an environment away from comfort and convenience amenities normally found in developed recreation areas. Possessing outdoor skills will be important for visitors in the remote portions of these areas.

A trail management objective (TMO) is completed for each trail and trails are managed and maintained in accordance with their specific TMOs. Volunteers play an important role in helping to maintain many popular trails. Through either individual or sponsored organization agreements, volunteers actively work with local district personnel to identify and address trail maintenance needs.

Landscape and Scenery

Background

The Forest contains picturesque mountains and valleys of great scenic beauty. The majority of the Forest provides a natural-appearing landscape. The scenic and aesthetic values of the Forest are maintained by meeting Scenic Integrity Objectives (SIOs). Scenic Integrity is a measure of the degree to which a natural or cultural landscape is visually perceived to be complete and intact, free from detractions from the natural or socially valued appearance. SIOs are classified as Very High, High, Moderate, Low, Very Low to No Integrity. The Very Low and No Integrity SIOs are not adopted on the GWNF. The approximate acres of Scenic Integrity Objectives to be maintained are: Very High xxx,xxx acres, High xxx,xxx acres, Moderate xxx,xxx acres, and Low xxx,xxx acres.

For a Very High (VH) scenic integrity area, landscapes exist where the valued landscape character is intact and appears natural or unaltered with only minute visual disturbances to the valued scenery. The existing landscape character and sense of place is expressed at the highest possible level. VH generally provides only for ecological changes to be visible in natural landscapes and complete visual intactness of cultural landscapes. The SIO level is achieved immediately upon completion of any projects.

For a High (H) scenic integrity area, landscapes exist where the valued landscape character appears intact, natural and unaltered even though disturbances may be present. These deviations remain unnoticed to the casual observer because they have been designed to repeat attributes of form, line, color, texture and scale found in the valued scenery. This SIO level is achieved as soon after project completion as possible or within three years maximum.

For a Moderate (M) scenic integrity area, landscapes exist where the valued landscape character appears slightly altered. Noticeable human-created deviations are minor and remain visually subordinate to the landscape character being viewed, because they repeat its form, line, color, texture, pattern and scale. This SIO level is achieved as soon after project completion as possible or within three years maximum.

For a Low (L) scenic integrity area, landscapes exist where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings.

The Scenery Treatment Guide for the Southern Region (issued April 23, 2008) and the scenic integrity objectives (SIO) within the standards of the Plan will provide guidance for mitigating scenery impacts for management activities and should be incorporated into project planning and implementation.

Desired Conditions for Scenery

The mountainous George Washington National Forest provides many opportunities for high quality, nature-related scenic viewing and rural culture sightseeing and tourism. Numerous distinctively scenic and historic "special places" of a localized importance are available for people to enjoy. The George Washington National Forest offers premier opportunities for scenic viewing from trails, roads, rivers and developed recreation sites.

The desired conditions for scenery across the forest include intact, natural appearing, predominantly forested mountaintops and side slopes. The valleys are also predominantly forested except for openings for cultural or historic sites, pastoral areas, rivers, developed

recreation areas, roads and administrative sites. These naturally appearing landscapes include areas such as open woodlands, open wetlands, rock outcrops and talus slopes. Management activities in areas with SIO of Low may have scenery that appears moderately altered. Disturbances to scenery in the Low SIO may reflect, introduce or borrow scenery attributes from outside the landscape being viewed (such as the size, shape, edge effect and pattern of natural openings, vegetative type changes or socially valued architectural styles).

Heritage Resources

Background

The George Washington National Forest contains a multitude of sites representing past human events. The variety of heritage resources is impressive, such as those related to Native American habitation, the Civil War and the Civilian Conservation Corps. Sites range from an antebellum mansion to numerous ruins of 19th Century furnaces. These sites provide forest visitors a valuable lesson in the history of these lands prior to federal ownership. National Forest lands have been called "the lands that nobody wanted", but these cultural resources indicate that there were many people throughout history who struggled to survive or thrived making a living off of these lands. The heritage inventory boasts some xx,xxx historical artifacts.

Our overall strategy for sustaining the heritage that is a desirable part of the setting and character of the GWNF involves continuing to identify significant sites, protecting them from damage, and planning for future research and interpretation opportunities. Approximately xx percent of the GWNF have been surveyed for archaeological and historic sites. Surveys will continue to be routinely conducted prior to site disturbance activities. Work load priorities are often affected by available staffing and resources; therefore, partnerships and agreements with universities also play an important role in helping to achieved desired conditions

Desired Conditions for Heritage Resources

Heritage resources are protected. Those that are particularly susceptible to vandalism or robbery are not publicly identified on-site. Protection for some sites is done through covering them with soil or gravel after carefully documenting the resource, location and method. However, many heritage resources are openly available for public viewing. Those that are readily accessible along roadways or short trails are the subject of on-site interpretation in the form of signs or programs. These interpretive opportunities are provided to enhance public understanding of and appreciation for the cultural history of the forest. Opportunities are also provided for the public to volunteer with the Passport in Time program, assisting Forest Service archaeologists in a formal "dig" and documentation of a historic or pre-historic site on the national forest.

Infrastructure – Roads and Facilities

Background

Facilities include buildings, kiosks, shelters, etc. located on the National Forest, as well as administrative offices and work centers in nearby towns and cities.

More narrative about roads to come. The following maintenance levels are provided to National Forest System roads:

Table xx. Operational maintenance levels of forest roads

Operational Maintenance Level of Forest Roads	
Operational Maintenance Level	**Miles**
1 - Basic Custodial Care (Closed)	225
2 - High Clearance Vehicles	1,078
3 - Suitable for Passenger Cars	405
4 - Moderate Degree of User Comfort	96
5 - High Degree of User Comfort	8
Grand Total	1,812

Desired Conditions for Roads and Facilities

A minimal transportation system is provided that supplies safe and efficient access to the National Forest for forest users while protecting forest resources. The desire for motorized access to the Forest is balanced against conflicting goals of providing for certain types of diverse wildlife habitat and non-motorized recreation use. Roads serve a variety of needs including access for recreational purposes, fire protection, vegetation and wildlife management, access to facilities, access to private land inholdings, and energy and mineral development.

Motorized access occurs only on 'designated' roads and trails.

Roads that are no longer needed have been decommissioned and obliterated. Roads that are not used for an extended period of time have been closed, stabilized and have native vegetation cover.

Permanent vegetation is established on roadbeds of intermittent service roads. Cut and fill slopes of all roads have permanent vegetation established.

Large blocks of isolated National Forest System land are usable by the general public. Forest development roads and trails exist across private land with adequate rights-of-way.

Facilities reflect the natural and cultural landscape, and provide optimal service to customers and cooperators. They are in good condition, safe, clean, structurally sound, energy efficient and accessible to all users.

Lands and Special Uses

Background

Narrative to come.

Desired Conditions for Land and Special Uses

Lands

National forest ownership is consolidated and provides reasonable access and efficiency of land management. Encroachments are none to few. No isolated forest tracts without legal access exist. Many small National Forest tracts surrounded by private lands are generally accessible to the public.

The majority of Forest lands identified for exchange are lands that are attractive to private individuals, thus allowing for acquisition of other desirable parcels.

Lands identified for acquisition are primarily in-holdings or adjoining parcels which are partially surrounded by Forest lands which will aid in consolidating National Forest ownership.

The Appalachian National Scenic Trail has legal access and is sufficiently protected from developments which would detract for the Trail experience.

Landlines and property corners are established to Forest Service standards. Landlines are easily locatable and highly visible. The miles of boundary line to be maintained is less than what currently exists.

Private land improvements are not constructed on National Forest System lands as a result of erroneous surveys. No land title claims or encroachments exist.

Special Uses

Special uses exist that serve a local, regional or national public benefit and need by providing for public access, transportation efficiency for commerce, military training, a reliable supply of electricity, natural gas, water and alternative forms of energy, competitive recreational events, outfitting and guiding services, and communication networks.

Special uses occur that serve an individual (private) benefit by providing access to private land.

The number and acreage of special use authorizations for individual (private) use do not increase rapidly over current numbers; with terminated uses tending to offset new uses.

Existing flood control dams are maintained in good working order per provisions in the special use permit.

The Virginia Power Bath County Pumped Storage Project remains operational.

Wind energy applications are considered a request for a special use permit.

Communication Sites

Each site is developed and utilized to its greatest potential in order to reduce the need to develop additional sites. All users' equipment blends visually with forest surroundings. All users' equipment and frequencies coexist. New equipment is as inconspicuous to the surrounding terrain as possible. Vegetation consists predominantly of low grasses and wildflowers with some native deciduous and evergreen shrubs and scattered trees. For the most part the areas are on gently rolling terrain, some with exposed surface rock, rock outcrops, and meandering streams.

Obsolete sites have been rehabilitated and blend into the surrounding landscape with native vegetation.

Utility Corridors

Each utility corridor is developed and utilized to its greatest potential in order to reduce the need to develop additional corridors.

Utility corridors retain low growing vegetation which conforms to the safe operating requirements of the utility and which reduce surface water runoff and erosion. Vegetation consists predominantly of grasses and wildflowers, low-growing native deciduous and evergreen shrubs, low-growing trees like dogwood and redbud, and young, sapling-sized trees. These corridors also provide open habitat conditions for wildlife.

Timber Management

Background

Timber and other wood products are both a byproduct of habitat management activities and a purpose for timber management on lands suitable for production and/or harvest. The following desired conditions apply to lands suitable for timber production in this area.

Desired Conditions for Timber Management

Forested stands are healthy, vigorous, of appropriate stocking levels and desirable species composition, and free to grow from competing less desirable trees on lands suitable for timber production. A regenerated forest stand contains tree species that commonly occur or have historically occurred naturally on similar sites within that ecosystem. Regenerated stands contribute to a variety of age classes and facilitate an even flow of wood products for societal use that benefit the local economy.

On areas suitable for timber production, trees and the products derived from them are a highly valued forest resource, carefully managed to achieve the desired condition of a given area in a cost-effective manner. For societal use, forest products vary from high quality veneer and boards for furniture and flooring to small diameter pulp logs used in the production of paper, woody biomass, and personal use firewood. A stable supply of wood products contributes to the social and economic well-being of the people living in the area and helps maintain a way of life long associated with those living within the area.

The ecological value of leaving dead, dying, and damaged trees as a natural part of the ecosystem is balanced with aesthetic desires and economic values of the timber resource that can be used for fuelwood, woody biomass, pulpwood, or sawtimber if removed prior to deterioration or its value being lost.

Mineral Resources

Background

Congress authorized the National Forests to help meet public demand for energy and non-energy minerals. Unlike other federal agencies, such as the National Park Service which have more limited missions, the National Forests and the Bureau of Land Management have wide-ranging, multiple benefit missions. Congress established the roles of the Forest Service and the Bureau of Land Management in implementing the federal leasable mineral program, which on the George Washington National Forest currently involves federal oil and gas leasing. Since 1980 a few exploration wells have been drilled on the George Washington National Forest,

but the wells did not find commercial deposits of oil and gas. New exploration targets, such as the Marcellus shale, are potential exploration targets in the future.

The Forest also is authorized to manage building stone, landscaping rock, aggregate, rip rap, and other rock or earthen materials under the federal mineral materials program. The Forest uses mineral materials to meet desired conditions for a wide variety of resource management. Mineral materials are essential to build and maintain the Forest's roads, trails, and other infrastructure. Like firewood, mineral materials also may be sold to the public, and can be provided free to public agencies, such as state highway departments.

A continuing supply of energy and non-energy minerals is essential to manage the Forest and for public use and enjoyment of the Forest. This continuous supply of minerals originates mostly from local, regional, national, and international sources off the Forest, but the Forest also has opportunities to supply a small part of the minerals required to manage the Forest and for public use and enjoyment of the Forest.

Desired Conditions for Mineral Resources

The Forest's mineral resources help meet public demand for energy and non-energy minerals and help meet desired conditions for other resources and programs.

The Forest's mineral materials (aggregate, rip rap, gabion rock, building stone, landscaping rock, etc.) are utilized to: help build and maintain trails, roads, campgrounds, and watershed improvement projects; control erosion and sedimentation; restore riparian and aquatic habitat; prevent or repair flood damage; for other uses to manage and sustain the Forest; and help meet public demand and other governmental agency needs.

Federal oil and gas leases are in effect in some areas, but on-the-ground operations are few and use less than one percent of acreage in federal leases.

On National Forest System tracts where mineral rights are private (outstanding or reserved rights), the exercise of private mineral rights to explore and develop mineral resources is respected, and the Forest Plan Direction is subject to the valid existing rights. As in the past, the exercise of private mineral rights is rare. When private mineral rights are exercised, operations are using only as much of the surface as is reasonably necessary.

Looking across the Forest at all mineral operations, federal or private, mineral activity is sporadic and scarce. The areas of mineral extraction are relatively small and isolated features on the vast landscape of the Forest. The total area of mineral operations is less than one-half of one percent of the Forest.

All operations are reclaimed, and when possible, reclamation is used to enhance the desired condition for other resources, such as wildlife openings, ponds for wildlife, parking for recreation, staging area for fire fighting and helicopters, etc. Reclamation also can be seen at historic abandoned mines.

Collection of geologic materials for scientific or educational purposes, and recreational gold panning and rock hounding may occasionally be seen.

Rangeland Resources

Background

There are three current grazing permits: the Moody Tract and the Whiting Tract along the Shenandoah River and the Zepp Tannery Tract on Cedar Creek.

Desired Conditions for Rangeland Resources

A landscape character setting that includes pastoral landscapes and bottomland hardwoods exists.

Healthy forage for both domestic livestock and wildlife; and valuable grassland habitat for many species of birds, is provided.

Rangelands are not contributing to the degradation of water quality, aquatic species, threatened, endangered or sensitive species habitat.

Drinking Water

Background

Water has been a key factor in National Forest Management since the creation of the National Forests. Proper management of water requires managing healthy forests throughout the watershed and taking appropriate management precautions in all activities. However, one of the main aspects of protecting water quality is managing the streams and the lands immediately adjacent to the streams – the riparian areas. Riparian areas are managed with direction that can be found related to Management Prescription Area 11 – Riparian Corridors. On the Forest we must provide water quality that is sufficient to support all of the aquatic life in our streams. Many of these plants and animals are very sensitive to water quality and we have a number of endangered and threatened aquatic species. Therefore, we have established standards that protect water quality for these species. By protecting them, we provide water quality of very high quality for drinking water sources.

The following is a list of water systems that rely on the National Forest for drinking water supplies.

DRINKING WATER SUPPLIES WITHIN OR DOWNSTREAM OF GEORGE WASHINGTON NATIONAL FOREST

SYSTEM NAME	RIVER SYSTEM
LYNCHBURG, CITY OF	JAMES RIVER – COLLEGE HILL
LYNCHBURG, CITY OF	JAMES RIVER – ABERT
RICHMOND, CITY OF	JAMES RIVER
HENRICO COUNTY WATER SYSTEM	JAMES RIVER
AMHERST, TOWN OF	BUFFALO RIVER
JAMES RIVER CORRECTIONAL CTR	JAMES RIVER
LYNCHBURG, CITY OF	PEDLAR RESERVOIR
MAURY SERVICE AUTHORITY	MAURY RIVER
COVINGTON, CITY OF	JACKSON RIVER
CLIFTON FORGE, TOWN OF	SMITH CREEK
SOUTH RIVER SANITARY DISTRICT - ACSA	COLES RUN RESERVOIR
STAUNTON, CITY OF	NORTH RIVER DAM
HARRISONBURG, CITY OF	DRY RIVER – RIVEN ROCK
HARRISONBURG, CITY OF	NORTH RIVER
BRIDGEWATER, TOWN OF	NORTH RIVER
BROADWAY, TOWN OF	NORTH FORK SHENANDOAH RIVER
FOOD PROCESSORS WATER COOPERATIVE, INC	NORTH FORK SHENANDOAH RIVER
WOODSTOCK, TOWN OF	NORTH FORK SHENANDOAH RIVER
FRONT ROYAL, TOWN OF	SOUTH FORK SHENANDOAH RIVER

WINCHESTER, CITY OF	NORTH FORK SHENANDOAH RIVER
STRASBURG, TOWN OF	NORTH FORK SHENANDOAH RIVER
FAIRFAX COUNTY WATER AUTHORITY	POTOMAC RIVER
BERRYVILLE, TOWN OF	SHENANDOAH RIVER
LEESBURG, TOWN OF	POTOMAC RIVER
BERKELEY COUNTY PSWD-POTOMAC RIVER	MAIN STEM POTOMAC RIVER
ROMNEY WATER DEPT	SOUTH BRANCH POTOMAC RIVER
MOOREFIELD MUNICIPAL WATER	SOUTH BRANCH POTOMAC RIVER AND SOUTH FORK OF THE SOUTH BRANCH POTOMAC RIVER
CHARLES TOWN WATER DEPT	SHENANDOAH RIVER
HARPERS FERRY WATER WORKS	MAIN STEM POTOMAC RIVER
SHEPHERDSTOWN WATER	MAIN STEM POTOMAC RIVER
PAW PAW WATER WORKS	MAIN STEM POTOMAC RIVER
NAVY INFORMATION OPERATIONS COMAND/MB	SOUTH FORK OF THE SOUTH BRANCH POTOMAC RIVER

While most of these water sources are from rivers whose watersheds contain areas of private and federal lands, three reservoirs are located on rivers whose watersheds are predominantly National Forest System lands. These are:

- Pedlar Reservoir serving Lynchburg, Virginia
- Elkhorn Lake and Staunton Reservoir serving Staunton, Virginia
- Smith Creek Reservoir serving Clifton Forge, Virginia

Desired Conditions for Drinking Water

Abundant clean water is produced on the Forest in response to the increasing downstream public need for drinking water, as many communities in Virginia, West Virginia and the District of Columbia rely on the high quality water from the National Forest for their drinking water.

Forest management activities are focused on protecting drinking water sources while achieving the other ecological, social and economic goals of the Forest Plan. Practices to prevent contamination of drinking water sources are applied and monitored.

Significant potential sources of drinking water contamination are identified and the susceptibility of the water supply to contamination from these sources is determined. Existing roads, trails, developed and dispersed recreation sites, and areas of concentrated recreation use are examined and problems mitigated. Old mining, grazing, and agricultural areas are stabilized and rehabilitated where necessary.

Dams to store municipal drinking water are frequently found immediately downstream from the Forest on State or private lands. Expansion of these reservoirs to provide additional drinking water needs may be necessary in the future. Water-based recreation and associated facilities may be developed and maintained when these reservoirs are on or adjacent to national forest land and such development is acceptable to the municipality.

Vegetation management activities are designed to maintain and restore habitat for a variety of native species in conditions that are resistant to large-scale disturbances that could affect drinking water. These large-scale disturbances include wildland fires, landslides, and insect

and disease epidemics (including but not limited to gypsy moth, southern pine beetle, and oak decline).